APPENDIX: D

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AIR QUALITY IMPACT ANALYSIS FOR THE PROPOSED KB HOME ELMWOOD PROJECT, CITY OF MILPITAS

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September 2004

EXISTING CONDITIONS

Air Pollution Climatology

The amount of a given pollutant in the atmosphere is determined by the amount of pollutant released and the atmosphere's ability to transport and dilute the pollutant. The major determinants of transport and dilution are wind, atmospheric stability, terrain and, for photochemical pollutants, sunshine.

Northwest winds and northerly winds are most common in the project area, reflecting the orientation of the Bay and the San Francisco Peninsula. Winds from these directions carry pollutants released by autos and factories from upwind areas of the Peninsula toward Milpitas, particularly during the summer months. Winds are lightest on the average in fall and winter. Every year in fall and winter there are periods of several days when winds are very light and local pollutants can build up.

Pollutants can be diluted by mixing in the atmosphere both vertically and horizontally. Vertical mixing and dilution of pollutants are often suppressed by inversion conditions, when a warm layer of air traps cooler air close to the surface. During the summer, inversions are generally elevated above ground level, but are present over 90 percent of the time in both the morning and afternoon. In winter, surface-based inversions dominate in the morning hours, but frequently dissipate by afternoon.

Topography can restrict horizontal dilution and mixing of pollutants by creating a barrier to air movement. The South Bay has significant terrain features that affect air quality. The Santa Cruz Mountains and Hayward Hills on either side of the South Bay restrict horizontal dilution, and this alignment of the terrain also channels winds from the north to south, carrying pollution from the northern Peninsula toward Milpitas.

The combined effects of moderate ventilation, frequent inversions that restrict vertical dilution and terrain that restrict horizontal dilution give San Jose a relatively high atmospheric potential for pollution compared to other parts of the San Francisco Bay Air Basin and provide a high potential for transport of pollutants to the east and south.

Ambient Air Quality Standards

<u>Criteria Pollutants</u>

Both the U. S. Environmental Protection Agency and the California Air Resources Board have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants which represent safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. Table 1 identifies the major criteria pollutants, characteristics, health effects and typical sources. The federal and California state ambient air quality standards are summarized in Table 2.

The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects. As a result, the federal and state standards differ in some cases. In general, the California state standards are more stringent. This is particularly true for ozone and particulate matter (PM_{10} and $PM_{2.5}$)

The U.S. Environmental Protection Agency established new national air quality standards for ground-level ozone and for fine particulate matter in 1997. The existing 1-hour ozone standard of 0.12 PPM microns or less) is to be phased out and replaced by an 8-hour standard of 0.08 PPM. Implementation of the 8-hour standard was delayed by litigation, but was determined to be valid and enforceable by the U. S. Supreme Court in a decision issued in February of 2001.

Suspended particulate matter (PM) is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, and dust. "Inhalable" PM consists of particles less than 10 microns in diameter, and is defined as "suspended particulate matter" or PM_{10}. Fine particles are less than 2.5 microns in diameter ($PM_{2.5}$). $PM_{2.5}$, by definition, is included in PM_{10}.

In 1997 new national standards for fine Particulate Matter (diameter 2.5 microns or less) were adopted for 24-hour and annual averaging periods. The current PM_{10} standards were to be retained, but the method and form for determining compliance with the standards were revised.

The State of California regularly reviews scientific literature regarding the health effects and exposure to PM and other pollutants. On May 3, 2002, the California Air Resources Board (CARB) staff recommended lowering the level of the annual standard for PM_{10} and establishing a new annual standard for $PM_{2.5}$ (particulate matter 2.5 micrometers in diameter and smaller). The new standards became effective on July 5, 2003.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are another group of pollutants of concern. There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important, in terms of health risk, are diesel particulate, benzene, formaldehyde, 1,3-butadiene and acetaldehyde.

Public exposure to TACs can result from emissions from normal operations, as well as

Table 1: Major Criteria Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
Ozone	A highly reactive photochemical pollutant created by the action of sunshine on ozone precursors (primarily reactive hydrocarbons and oxides of nitrogen. Often called photochemical smog.	! Eye Irritation ! Respiratory function impairment.	The major sources ozone precursors are combustion sources such as factories and automobiles, and evaporation of solvents and fuels.
Carbon Monoxide	Carbon monoxide is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels.	! Impairment of oxygen transport in the bloodstream. ! Aggravation of cardiovascular disease. ! Fatigue, headache, confusion, dizziness. ! Can be fatal in the case of very high concentrations.	Automobile exhaust, combustion of fuels, combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide	Reddish-brown gas that discolors the air, formed during combustion.	! Increased risk of acute and chronic respiratory disease.	Automobile and diesel truck exhaust, industrial processes, fossil-fueled power plants.
Sulfur Dioxide	Sulfur dioxide is a colorless gas with a pungent, irritating odor.	! Aggravation of chronic obstruction lung disease. ! Increased risk of acute and chronic respiratory disease.	Diesel vehicle exhaust, oil-powered power plants, industrial processes.
Particulate Matter	Solid and liquid particles of dust, soot, aerosols and other matter which are small enough to remain suspended in the air for a long period of time.	! Aggravation of chronic disease and heart/lung disease symptoms.	Combustion, automobiles, field burning, factories and unpaved roads. Also a result of photochemical processes.

Table 2: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standard	State Standard
Ozone	1-Hour 8-Hour	0.12 PPM 0.08 PPM	0.09 PPM --
Carbon Monoxide	8-Hour 1-Hour	9.0 PPM 35.0 PPM	9.0 PPM 20.0 PPM
Nitrogen Dioxide	Annual Average 1-Hour	0.05 PPM --	-- 0.25 PPM
Sulfur Dioxide	Annual Average 24-Hour 1-Hour	0.03 PPM 0.14 PPM --	-- 0.04 PPM 0.25 PPM
PM_{10}	Annual Average 24-Hour	50 µg/m^3 150 µg/m^3	20 µg/m^3 50 µg/m^3
$PM_{2.5}$	Annual 24-Hour	15 µg/m^3 65 µg/m^3	12 µg/m^3 --
Lead	Calendar Quarter 30 Day Average	1.5 µg/m^3 --	-- 1.5 µg/m^3
Sulfates	24 Hour	25 µg/m^3	--
Hydrogen Sulfide	1-Hour	0.03 PPM	--
Vinyl Chloride	24-Hour	0.01 PPM	--

PPM = Parts per Million
µg/m^3 = Micrograms per Cubic Meter

accidental releases. Health effects of TACs include cancer, birth defects, neurological damage and death.

Ambient Air Quality

Criteria Air Pollutants

Area Air Quality Management District (BAAQMD) monitors air quality at several locations within the San Francisco Bay Air Basin. The closest multi-pollutant monitoring sites to the project site are located in downtown San Jose on Fourth Street and in Fremont on Chapel Way. Table 3 summarizes exceedances of State and Federal standards at these monitoring sites during the period 2000-2002. Table 3 shows that ozone and PM_{10} exceed the state standards in the South Bay. Violations of the carbon monoxide standards had been recorded at the downtown San Jose site prior to 1992.

Of the three pollutants known to at times exceed the state and federal standards in the project area, two are regional pollutants. Both ozone and particulate matter (PM_{10} and $PM_{2.5}$) are considered regional pollutants in that concentrations are not determined by proximity to individual sources, but show a relative uniformity over a region. Thus, the data shown in Table 3 for ozone and PM_{10} provide a good characterization of levels of these pollutants on the project site.

Carbon monoxide is a local pollutant, i.e., high concentrations are normally only found very near sources. The major source of carbon monoxide, a colorless, odorless, poisonous gas, is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volumes.

Toxic Air Contaminants

The TAC monitoring network operated by the BAAQMD includes gaseous samples collected over 24-hour periods on a 12-day sampling frequency. The network began in 1986 with six sites, and has gradually been expanded to its present size of 20 sites. The analytical protocol includes the following 12 gaseous compounds: benzene, carbon tetrachloride, chloroform, ethylene dibromide, ethylene dichloride, methyl tert butyl ether (MTBE), methylene chloride, perchloroethylene, toluene, trichloroethane, trichloroethylene, and vinyl chloride. Year 2001 data from the San Jose Fourth Street monitoring site are shown in Table 4.

The current inventory of Toxic Air Contaminant emissions maintained by the California Air Resources Board lists no in the immediate the project vicinity.[1]

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[1] Bay Area Air Quality Management District, Toxic Air Contaminant Control Program Annual Report 2001,

Table 3: Summary of Criteria Pollutant Air Quality Data for San Jose Fourth Street and Fremont Chapel Way Sites

Pollutant	**Standard**	**Site**	**Days Exceeding Standard in:**		
			2000	**2001**	**2002**
Ozone	Federal 1-Hour	San Jose Fremont	0 0	0 0	0 0
Ozone	State 1-Hour	San Jose Fremont	0 2	2 3	0 3
Ozone	Federal 8-Hour	San Jose Fremont	0 0	0 0	0 0
Carbon Monoxide	State/Federal 8-Hour	San Jose Fremont	0 0	0 0	0 0
Nitrogen Dioxide	State 1-Hour	San Jose Fremont	0 0	0 0	0 0
PM_{10}	Federal 24-Hour	San Jose Fremont	0 0	0 0	0 0
PM_{10}	State 24-Hour	San Jose Fremont	7 1	4 3	0 1
$PM_{2.5}$	Federal 24-Hour	San Jose Fremont	0 0	0 0	0 0

Source: California Air Resources Board, Aerometric Data Analysis and Management System (ADAM), (www.arb.ca.gov/adam/), 2003.

Table 4: Summary of 2001 Ambient Air Toxics Monitoring Data for San Jose Fourth Street Site

Compound	**LOD (ppb)**	**% of Samples < LOD**	**Maximum Conc. (ppb)**	**Minimum Conc. (ppb)**	**Mean Conc. (ppb)**
Benzene	0.10	0	2.50	0.20	0.68
Chloroform	0.02	94	0.08	<0.02	0.02
Carbon Tetrachloride	0.01	0	0.11	0.09	0.10
Ethylene Dibromide	0.02	100	<0.02	<0.02	<0.02
Ethylene Dichloride	0.10	100	<0.10	<0.10	<0.10
Methyl Tert Butyl Ether	0.50	29	4.60	<0.50	0.96
Methylene Chloride	0.50	94	0.60	<0.50	0.27
Perchloroethylene	0.01	3	0.22	<0.01	0.06
Toluene	0.10	0	5.40	0.30	1.49
1, 1, 1 -Trichloroethane	0.05	23	0.09	<0.05	0.05
Trichloroethylene	0.08	100	<0.08	<0.08	<0.08
Vinyl Chloride	0.30	100	<0.30	<0.30	<0.30

LOD = the limit of detection of the analytical method used.

ppb = parts per billion

Source: Bay Area Air Quality Management District, Toxic Air Contaminant Control Program Annual Report 2001, July 2003.

Attainment Status and Regional Air Quality Plans

The federal Clean Air Act and the California Clean Air Act of 1988 require that the State Air Resources Board, based on air quality monitoring data, designate portions of the state where the federal or state ambient air quality standards are not met as "nonattainment areas". Because of the differences between the national and state standards, the designation of nonattainment areas is different under the federal and state legislation.

The Bay is currently a nonattainment for 1-hour ozone standard and attainment of unclassified for other federal standards. However, in April 2004, U.S. EPA made a final finding that the Bay Area has attained the national 1-hour ozone standard. The finding of attainment does not mean the Bay Area has been reclassified as an attainment area for the 1-hour standard. The region must submit a re-designation request to EPA in order to be reclassified as an attainment area.

The California Air Resources Board and U. S. Environmental Protection Agency have both proposed that the San Francisco Bay Area be classified as a nonattainment area for the federal 8-hour standard. The California Air Resources Board and U. S. Environmental Protection Agency have both proposed that the San Francisco Bay Area be considered unclassifiable with respect to the federal $PM_{2.5}$ standards. Unclassifiable means that an area cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant. U.S. EPA plans to finalize $PM_{2.5}$ designations by December 15, 2004.

Under the California Clean Air Act Santa Clara County is a nonattainment area for ozone and PM_{10}. The county is either attainment or unclassified for other pollutants. The California Clean Air Act requires local air pollution control districts to prepare air quality attainment plans. These plans must provide for district-wide emission reductions of five percent per year averaged over consecutive three-year periods or if not, provide for adoption of "all feasible measures on an expeditious schedule".

Sensitive Receptors

The Bay Area Air Quality Management District defines sensitive receptors as facilities where sensitive receptor population groups (children, the elderly, the acutely ill and the chronically ill) are likely to be located. These land uses include residences, schools playgrounds, child care centers, retirement homes, convalescent homes, hospitals and medical clinics. The western part of the project site abuts residences to the north, while the eastern part of the project site abuts multi-family homes to the south.

Significance Criteria

The document *BAAQMD CEQA Guidelines*[2] provide the following definitions of a significant air quality impact:

$ A project contributing to carbon monoxide (CO) concentrations exceeding the State Ambient Air Quality Standard of 9 parts per million (ppm) averaged over 8 hours or 20 ppm for 1 hour would be considered to have a significant impact.

- A project that generates criteria air pollutant emissions in excess of the BAAQMD annual or daily thresholds would be considered to have a significant air quality impact. The current thresholds are 15 tons/year or 80 pounds/day for Reactive Organic Gases (ROG), Nitrogen Oxides (NO_x) or PM_{10}. Any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact.

- Any project with the potential to frequently expose members of the public to objectionable odors would be deemed to have a significant impact.

- Any project with the potential to expose sensitive receptors or the general public to substantial levels of toxic air contaminants would be deemed to have a significant impact.

The BAAQMD significance threshold for construction dust impact is based on the appropriateness of construction dust controls. The BAAQMD guidelines provide feasible control measures for construction emission of PM_{10}. If the appropriate construction controls are to be implemented, then air pollutant emissions for construction activities would be considered less-than-significant.

2 Bay Area Air Quality Management District, BAAQMD CEQA Guidelines, 1996 (Revised December 1999).

IMPACTS

Construction-Related Impacts

Construction activities such as dearing, excavation and grading operations, construction vehicle traffic and wind blowing over exposed earth would generate exhaust emissions and fugitive particulate matter emissions that would temporarily affect local air quality for adjacent land uses. Construction-related emissions are generally short-term is duration, but may still cause adverse air quality impacts. According to the BAAQMD, fine particulate matter (PM_{10}) is the pollutant of greatest concern during construction. Although equipment and vehicles create gaseous pollutants such as carbon monoxide and ozone precursors, these emissions are considered as included in the emission inventory that is the basis for regional air plans, and are not expected to impede attainment or maintenance of ozone and carbon monoxide standards in the Bay Area.[3]

During construction various diesel-powered vehicles and equipment would be in use on the site. In 1998 the California Air Resources Board identified particulate matter from diesel-fueled engines as a toxic air contaminant (TAC). CARB has completed a risk management process that identified potential cancer risks for a range of activities using diesel-fueled engines.[4] High volume freeways, stationary diesel engines and facilities attracting heavy and constant diesel vehicle traffic (distribution centers, truckstop) were identified as having the highest associated risk

Health risks from Toxic Air Contaminants are function of both concentration and duration of exposure. Unlike the above types of sources, construction diesel emissions are temporary, affecting an area for a period of days or perhaps weeks. Additionally, construction related sources are mobile and transient in nature, and the bulk of the emission occurs within the project site at a substantial distance from nearby receptors. Because of its short duration, health risks form construction emissions of diesel particulate would be a less-than-significant impact.

Grading, earthmoving and excavation are the activities that generate the most PM_{10} emissions. Impacts would be localized and variable. The effects of construction activities would be increased dustfall and locally elevated levels of PM_{10} downwind of construction activity. Construction dust has the potential for creating a nuisance at nearby properties. This impact is considered potentially significant.

Permanent Local Impacts

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[3] Bay Area Air Quality Management District, BAAQMD CEQA Guidelines, 1996 (Revised December 1999).

[4] California Air Resources Board, Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles, October 2000.

On the local scale, the project would change traffic on the local street network, changing carbon monoxide levels along roadways used by project traffic. Carbon monoxide is an odorless, colorless poisonous gas whose primary source in the Bay Area is automobiles. Concentrations of this gas are highest near intersections of major roads.

Carbon monoxide concentrations under worst-case meteorological conditions have been predicted for signalized intersections affected by project. These intersections were selected as worst cast cases based on intersection Level Of Service and average delay. PM peak traffic volumes were applied to the a screening form of the CALINE-4 dispersion model to predict maximum 1-and 8-hour concentrations near these intersections under the worst-case assumption that background and project traffic changes would occur in 2004. Appendix 1 provides a description of the model and a discussion of the methodology and assumptions used in the analysis. The model results were used to predict the maximum 1- and 8-hour concentrations, corresponding to the 1- and 8-hour averaging times specified in the state and federal ambient air quality standards for carbon monoxide.

Table 5 shows the results of the CALINE-4 analysis for the peak 1-hour and 8-hour traffic periods in parts per million (PPM). The 1-hour values are to be compared to the federal 1-hour standard of 35 PPM and the state standard of 20 PPM. The 8-hour values in Table 5 are to be compared to the state and federal standard of 9 PPM.

Table 5 shows that existing predicted concentrations near the intersections meet the 1-hour and 8-hour standards. Concentrations with background traffic increases would be up to 1.2 PPM above existing levels. Traffic from the proposed project would increase concentrations by up to 0.4 PPM, but concentrations would remain below the most stringent state or federal standards.

Since project traffic would not cause any new violations of the 8-hour standards for carbon monoxide, nor contribute substantially to an existing or projected violation, project impacts on local carbon monoxide concentrations are considered to be less-than-significant.

Permanent Regional Impacts

Vehicle trips generated by the project would result in air pollutant emissions affecting the entire San Francisco Bay Air Basin. Regional emissions associated with project vehicle use have been calculated using the URBEMIS2002 emission model. The methodology used in estimating vehicular emissions is described in Attachment 2.

The incremental daily emission increase associated with project land uses is identified in Table 6 for reactive organic gases and oxides of nitrogen (two precursors of ozone) and PM_{10}. The Bay Area Air Quality Management District has established threshold of significance for ozone precursors and PM_{10} of 80 pounds per day. Proposed project emissions shown in Table 6 would exceed these thresholds of significance for both project scenarios, so the proposed project would have a significant effect on regional air quality.

Table 5: Worst Case Carbon Monoxide Concentrations Near Selected Intersections, in PPM

Intersection	Existing (2004) 1-Hr.	Existing (2004) 8-Hr.	Background (2004) 1-Hr.	Background (2004) 8-Hr.	Project Scen. 1 (2004) 1-Hr.	Project Scen. 1 (2004) 8-Hr.	Project Scen. 2 (2004) 1-Hr.	Project Scen. 2 (2004) 8-Hr.
Milpitas/ Calaveras	12.0	7.5	12.4	7.8	12.5	7.9	12.5	7.9
Alder/ Tasman	10.7	6.6	11.9	7.5	12.0	7.6	12.1	7.6
Great Mall/ Capitol/Montague	11.6	7.2	12.0	7.5	12.2	7.7	12.4	7.8
McCandless/Trade Zone/Montague	11.7	7.3	12.1	7.6	12.1	7.6	12.1	7.6
Main/ Montague	12.4	7.8	12.8	8.1	12.8	8.1	12.8	8.1
McCarthy/Otoole/ Montague	12.0	7.5	12.2	7.7	12.2	7.7	12.3	7.7
Most Stringent Standard	20.0	9.0	20.0	9.0	20.0	9.0	20.0	9.0

Table 6: Project Regional Emissions in Pounds Per Day

	Reactive Organic Gases	**Nitrogen Oxides**	**PM_{10}**
Scenario 1	126.3	124.3	97.8
Scenario 2	179.1	182.5	143.0
BAAQMD Significance Threshold	80.0	80.0	80.0

Indirect Toxic Air Contaminant Impacts

The project would place new residential uses adjacent the Elmwood Correctional Facility, which operates several standby diesel-powered emergency generators within the campus. Ten emergency generators at located at various locations within the facility, and each is typically used a few hours per month for testing. Standby diesel generators are operated under permits from the Bay Area Air Quality Management District.

The project residential uses are generally north and east of the Elmwood facility, which does not place them directly downwind any generators during prevailing winds that blow from the northwest. Also residences to the north have a buffer zone created by the Hetch Hetchy right-of-way and an intervening road, while residences to the east have a buffer zone created by an access easement, Lower Penitencia Creek and Abel Road. For the above reasons, indirect impacts of placing residences near standby diesel generators on an adjacent property are considered less-than-significant.

Cumulative Air Quality Impacts

According the BAAQMD CEQA Guidelines, a project that generates regional emissions in excess of the BAAQMD annual or daily thresholds would have a significant air quality impact individually and cumulatively. Proposed project emissions shown in Table 6 would exceed the BAAQMD thresholds, so the project would be considered to have a significant cumulative impact on regional air quality.

III. MITIGATION MEASURES

Construction

Require implementation of the following dust control measures by construction contractors during all construction phases:

$ Water all active construction areas at least twice daily.

$ Watering or covering of stockpiles of debris, soil, sand or other materials that can be blown by the wind.

$ Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.

$ Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.

$ Sweep daily (preferably with water sweepers) all paved access road, parking areas and staging areas at construction sites.

$ Sweep streets daily (preferably with water sweepers) if visible soil material is carried onto adjacent public streets.

• Hydroseed or apply non-toxic soil stabilizers to inactive construction areas.

$ Enclose, cover, water twice daily or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.).

$ Limit traffic speeds on unpaved roads to 15 mph.

$ Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

$ Replant vegetation in disturbed areas as quickly as possible.

Implementation of the measures would reduce construction impacts of the project to a less than significant level.

Operational Impacts

The BAAQMD has identified mitigation measures for reducing vehicle emissions from residential projects. Feasible mitigation measures to reduce vehicle emissions would include:

$ Provide bicycle lanes, sidewalks and/or paths, connecting project residences to adjacent schools, parks, the nearest transit stop and nearby commercial areas. Provide a satellite tele-commute center within or near the development.

$ Provide secure and conveniently placed bicycle parking and storage facilities at parks and other facilities.

- Implement feasible travel demand management (TDM) measures for a project of this type. This would include a ride-matching program, coordination with regional ride-sharing organizations, provision of transit information, and provision of shuttle service to major destinations.

- Allow only natural gas fireplaces, pellet stoves or EPA-Certified wood-burning fireplaces or stoves in single-family houses. Conventional open-hearth fireplaces should not be permitted. EPA-Certified fireplaces and fireplace inserts are 75 percent effective in reducing emissions from this source.

- Use electric lawn and garden equipment for landscaping.

- Construct transit amenities such as bus turnouts/bus bulbs, benches, shelters, etc.

- Provide direct, safe, attractive pedestrian access from project land uses to transit stops and adjacent development.

- Utilize reflective (or high albedo) and emissive roofs and light colored construction materials to increase the reflectivity of roads, driveways, and other paved surfaces, and include shade trees near buildings to directly shield them from the sun's rays and reduce local air temperature and cooling energy demand.

The commercial portion of the project should be required to apply TSM measures to reduce trips. Appropriate strategies would be:

- Provide physical improvements, such as sidewalk improvements, landscaping and bicycle parking that would act as incentives for pedestrian and bicycle modes of travel.

- Connect site with regional bikeway/pedestrian trail system.
- Provide transit information kiosks.
- Implement feasible travel demand management (TDM) measures for a project of this type. This would include a ride-matching program, guaranteed ride home programs, coordination with regional ridesharing organizations and transit incentives program.
- Provide showers and lockers for employees bicycling or walking to work.
- Provide secure and conveniently located bicycle parking and storage for workers and patrons.
- Provide electric vehicle charging facilities.
- Provide preferential parking for Low Emission Vehicles (LEVs).
- Specialty equipment (utility carts, forklifts, etc.) should be electrically, CNG or propane powered.
- Utilize reflective (or high albedo) and emissive roofs and light colored construction materials to increase the reflectivity of roads, driveways, and other paved surfaces, and include shade trees near buildings to directly shield them from the sun's rays and reduce local air temperature and cooling energy demand.

The above measures have the potential to reduce project-related regional emissions by 10-20%. Even with a reduction of this magnitude, project emissions would remain well above the BAAQMD significance threshold of 80 pounds per day. Project regional air quality impacts and cumulative impacts would remain significant after mitigation.

ATTACHMENT 1: CALINE-4 MODELING

The CALINE-4 model is a fourth-generation line source air quality model that is based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway. Given source strength, meteorology, site geometry and site characteristics, the model predicts pollutant concentrations for receptors located within 150 meters of the roadway. The CALINE-4 model allows roadways to be broken into multiple links that can vary in traffic volume, emission rates, height, width, etc.

A screening-level form of the CALINE-4 program was used to predict concentrations.[5] Normalized concentrations for each roadway size (2 lanes, 4 lanes, etc.) are adjusted for the two-way traffic volume and emission factor. Calculations were made for a receptor at a corner of the intersection, located 25 feet from the curb. Emission factors were derived from the California Air Resources Board EMFAC2002 computer program based on a 2004 Bay Area vehicle mix.

The screening form of the CALINE-4 model calculates the local contribution of nearby roads to the total concentration. The other contribution is the background level attributed to more distant traffic. The 1-hour background level in 2004 was taken as 7.8 PPM and the 8-hour background concentration was taken as 4.6 PPM. These backgrounds were estimated using isopleth maps and correction factors developed by the Bay Area Air Quality Management District.

Eight-hour concentrations were obtained from the 1-hour output of the CALINE-4 model using a persistence factor of 0.7.

[5] Bay Area Air Quality Management District, BAAQMD CEQA Guidelines, 1999.

ATTACHMENT 2: NEW VEHICLE TRAVEL EMISSIONS

Estimates of regional emissions generated by project traffic were made using a program called URBEMIS-2002.[6] URBEMIS-2002 is a program that estimates the emissions that result from various land use development projects. Land use project can include residential uses such as single-family dwelling units, apartments and condominiums, and nonresidential uses such as shopping centers, office buildings, and industrial parks. URBEMIS-2002 contains default values for much of the information needed to calculate emissions. However, project-specific, user-supplied information can also be used when it is available.

Inputs to the URBEMIS-2002 program include trip generation rates, vehicle mix, average trip length by trip type and average speed. Trip generation rates for project land uses were provided by the project transportation consultant. Average trip lengths and vehicle mixes for the Bay Area were used. Average speed for all types of trips was assumed to be 30 MPH.

The URBEMIS-2002 run assumed summertime conditions with an ambient temperature of 85 degrees F.

The analysis was carried out assuming project build-out would occur by the year 2005. The URBEMIS-2002 output is attached.

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[6] Jones and Stokes Associates, Software User's Guide: URBEMIS2002 for Windows with Enhanced Construction Module, Version 7.4, May 2003.